ASHRAE Standard 62.2-2004
Pilot Summary
March 2005

Data Collection

A total of 64 units were included in the comparison of required mechanical ventilation rates. The units were comprised of different housing types and sizes. Mobile homes and apartments were considered as well as single family homes. Information collected was based on the data needed to run programs to calculate both building tightness limits and depressurization tightness limits.

Ventilation Results

The current method used by weatherization is the quadrature equation used in the BTLa program in Zip Test Pro software. Using this method there were 30 buildings that would need ventilation, which is the same as using the ecotype equation in the Zip Test Pro² BTLa program. Under the 62.2-2004 ventilation standard, a total of 50 units required ventilation when the infiltration credit was applied. Without the infiltration credit, all units would require mechanical ventilation under the 62.2-2004 standard. Table 1 lists the ventilation rates in cfm.

Table 1

Method Used	**Low Value**	**High Value**	**Average**	**Median**	**Percentage**
Quadrature	18	201	74	70	46.9%
Ecotype	3	228	67	59	46.9%
62.2 with credit	1	73	29.3	30.5	78.1%
62.2 no credit	29	73	51.5	51.5	100%

The required rate of ventilation using the two BTLa equations varied on each unit with the ecotype equation resulting in a lower rate for 22 of the 30 units. In 5 of the 8 units where the ecotype was higher the required ventilation rate was over 100cfm. In Table 2, a breakdown of the number of units by a range of required ventilation rates gives an indication of what may need to be considered for equipment. Typically at lower ventilation rates, a single exhaust only system may be installed. At higher rates, multiple exhaust only systems may be used or a complete balanced system.

Table 2

Method Used	**0-50cfm**	**51-100cfm**	**101-150cfm**	**151-200cfm**	**>200cfm**
Quadrature	8	16	5		1
Ecotype	12	12	5		1

In Table 3, the breakdown shows the number of units by a range of required ventilation rates when using the 62.2-2004 standard. The results with the infiltration credit are lower than those using the quadrature rule when ventilation is required by both methods. The lower rates using the infiltration credit shifts to the higher range when there is no credit given for infiltration.

Table 3

Method Used	**<10cfm**	**11-30cfm**	**31-50cfm**	**51-70cfm**	**>70cfm**
62.2 with credit	8	17	20	4	1
62.2 no credit	0	1	29	30	4

Ventilation Systems

Installed mechanical ventilation was completed in 32 units of the 50 that required ventilation under 62.2-2004. The remaining units did not have ventilation installed, because the BTLa calculations did not result in ventilation being required. The agencies had the option to follow either method. As Table 3 indicated, the required rate of ventilation was low enough to install exhaust only systems to provide ventilation. The most frequent equipment used was installing an Energy Star exhaust fan in the unit. These fans were controlled with either a continuous switch that operated the fans at lower speeds or timers to provide intermittent ventilation. Intake air was provided for the exhaust fans in about 50% of the installations. The intake air was connected to the return air side of the forced air system in the unit. Passive inlet vents were added in two units. The associated costs to install the ventilation per unit varied from $384 to $1230.

	Ceiling Exhaust Fan	Inline Exhaust Fan
Total Installed	27	3
Continuous Switch To Control	15	1
Timer Switch To Control	11	2
Passive Intake Air Added	14	0

Equipment	Low Cost	High Cost	Average Cost	Median Cost
Exhaust Fan	$215.00	$715.00	$388.18	$391.04
Control	$92.50	$499.55	$179.82	$150.00
Fan and Control	$376.00	$880.98	$561.67	$560.00
Intake Air	$80.00	$424.00	$162.79	$80.00

The average cost in WISWAP for exhaust ventilation reported by the 3 agencies is $335.56. The average cost of exhaust ventilation with makeup air is $700.45.

Depressurization Tightness Limits

With the number of units that would require ventilation and the option of installing exhaust only systems most often, the depressurization of units needs to be considered. Only three units in the pilot study had a final CFM50 tightness lower than the calculated DTL. In all three units the existing exhaust equipment was causing the DTL to be exceeded. Two of the three units did require ventilation using 62.2 calculations, but not at a level by itself to cause excessive depressurization. The impact of adding ventilation at higher rates based on the BTLa equations was not determined from the data collected.

ASHRAE 62.2 section 6.4 requires that the two largest exhaust fan's net flow can not exceed 15cfm/100sq ft of floor area when there are atmospherically vented appliances in the unit. This value was calculated for all of the units in the pilot, regardless of venting setups, and none of the units had exhaust net flows higher than allowed.

Existing Equipment

The ASHRAE standards do require ventilation in bathrooms and kitchens. Data collected had only 17% of units having a kitchen exhaust fan and 40% of units had no fans. At least one bath fan was present in 53% of the units. The table below shows the relationship between existing equipment and the required ventilation rate.

Equipment	**Ventilation not required**	**<10cfm required**	**>10cfm required**	**Total**
Bath Fan(s) only	3	1	23	27
Kitchen Fan Only	1	0	3	4
Kitchen And Bath Fans	1	1	5	7
None	9	6	11	26

Input Values

To determine the effects of the weather factor, which ranges from .86 to 1.0 for Wisconsin, the ventilation rates were calculated for all units using the different factors. Under 62.2 with the infiltration credit, there was only at most a small variance of up to 8cfm from lowest to highest rate. This is not true using BTLa where there was as much as 25-35cfm from lowest to highest rate. The same happens when adjusting the flow coefficient from .6 to .7 compared to the average of using .65. Again the required rate of ventilation using 62.2 is not affected by using this range of coefficients. The amount of ventilation required by the BTLa changes considerably when both a high coefficient and low weather factor are used in the calculation. There were no direct correlations between any of the other input values and the amount of ventilation required.